



International Satellite Communications System (ISCS)

Providing Aviation-Related Weather Information to Over 80 Countries, and Meteorological Telecommunications Between the United States, Central America, and Caribbean Nations



LEGEND

- POR** Pacific Ocean Region, ISCS/World Area Forecast System (WAFS)
- AOR** Atlantic Ocean Region, ISCS/World Area Forecast System (WAFS)
- RMTN** WMO Region IV Meteorological Telecommunications Network
- SADIS** Satellite Distribution System, World Area Forecast System (WAFS), United Kingdom (UK) Operated
- INTELSAT V** satellite, for ISCS/WAFS Pacific Area Broadcast
- INTELSAT VI** satellite, for ISCS/WAFS, and ISCS/RMTN Atlantic Area Broadcast
- INTELSAT 604** satellite, for UK SADIS/WAFS Indian Ocean Area Broadcast



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Description of the International Satellite Communications System (ISCS)

ISCS is a satellite data distribution system operated by the United States National Weather Service (NWS), providing support to (1) the **World Area Forecast System (WAFS)**, and (2) the **Region IV Meteorological Telecommunications Network (RMTN)**. MCI WorldCom, under NWS contract, operates the satellite broadcast communications service for ISCS.

ISCS support for WAFS is on behalf of the International Civil Aviation organization (ICAO) and World Meteorological Organization (WMO). ISCS/WAFS purpose is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation. As a real-time, point to multi-point service, it operates on a 24-hour/365-day basis. NWS obtains funding support for ISCS/WAFS from the United States Federal Aviation Administration (FAA).

ISCS support for RMTN is part of a cooperative effort between NWS and WMO to improve the Global Telecommunications System (GTS), in WMO Region IV (North and Central America). RMTN allows for a two-way exchange of meteorological information between the United States and nations in the Caribbean and Central America. It replaced a much slower, less reliable, "daisy chain" of terrestrial circuits.

ISCS broadcasts utilize two commercial geostationary satellites, (1) **INTELSAT VI**, located over the Atlantic Ocean, for broadcast to the Atlantic Ocean area, including North and South America, Central America, and the Caribbean, and (2) **INTELSAT V**, located over the Pacific Ocean, for broadcasts to the Pacific Ocean Area and Eastern Asia. The broadcasts provide data to over 80 countries. The ISCS satellite uplinks are located at two MCI International Gateways in Andover, Maine, and Yacolt, Washington.

Aviation (WAFS) meteorological broadcasts for the rest of the world (Europe, Africa, Middle East, and Western Asia) are provided by the United Kingdom (UK) Meteorological Office, utilizing the INTELSAT 604 satellite located over the Indian Ocean. The UK WAFS program is known as the **Satellite Distribution System (SADIS)**.

ISCS and SADIS are the two components of the worldwide WAFS program, providing vital meteorological support for flight planning and air traffic management throughout the world.

Products for the International Satellite Communications System (ISCS)

ISCS/WAFS disseminates products prepared by two centers of the National Weather Service (NWS) National Centers For Environmental Prediction (NCEP), (1) the Aviation Weather Center (AWC), and (2) the Environmental Modeling Center (EMC). ISCS/WAFS products are also produced at over 115 NWS Offices nationwide. There are three types of products:

(1) **Gridded Binary (GRIB) Coded Data** (produced at EMC), containing forecasts for up to 9 standard flight levels of upper wind and temperature data, tropopause height and temperature, and maximum wind (height, speed, direction), using WMO Code FM-92-IX ext - GRIB, and a 1.25 x 1.25 degree global grid for flight planning.

(2) **Charts (T4 coded facsimile charts)** providing upper-air wind and temperature forecasts at selected flight levels (produced at EMC), and significant weather (SIGWX) forecasts (produced at AWC). Volcanic ash dispersion advisories are included when available.

(3) **Operational Meteorology (OPMET)** alphanumeric messages, consisting of (a) routine aviation weather reports (METARs), produced by Federal Aviation Administration (FAA) contract observers at airports, (b) special reports (SPECIs) which are METARs issued on a non-routine basis, also produced by FAA observers at airports, (c) terminal aerodrome forecasts (TAFs), produced at NWS Weather Forecast Offices (WFO) by NWS forecasters, (d) en-route hazardous weather warnings of significant meteorological information (SIGMETs), produced by Meteorological Watch Offices at the AWC, Alaska Aviation Weather Unit, and WFO's of Honolulu and Guam, (e) volcanic ash advisory messages (from Volcanic Ash advisory Centers Anchorage and Washington), and (f) tropical cyclone advisory messages (from Tropical Cyclone Advisory Centers Miami and Honolulu). Administrative messages are also broadcast as OPMET.

ISCS/RMTN, as part of the Global Telecommunications System (GTS), disseminates a wide variety of meteorological data products, the vast majority originating at the National Weather Service Telecommunications Gateway (NWSTG) in Silver Spring, MD. It also receives meteorological data from individual RMTN network sites for re-broadcast to all network sites through the NWSTG.

Product Collection and Dissemination for the International Satellite Communications System (ISCS)

Data in an X.25 protocol, is sent from the National Weather Service Telecommunications Gateway (NWSTG), in Silver Spring, MD, to the MCI International Gateway in Andover, Me, via redundant terrestrial links at 56 kilobytes per second. From Andover, data is sent directly to the INTELSAT VI satellite, and also to the INTELSAT V satellite (through the Yacolt, WA International Gateway via terrestrial link from Andover), for broadcast to users within each satellite footprint. The satellite broadcast is a C-band (5-6 GHz system), with a data rate of 38.4 kilobytes per second. The ISCS data stream is carried in 6 separate Permanent Virtual Circuits (PVC). The communications protocol over the satellite is a Hughes Communications satellite protocol.

Reception of the satellite broadcast is based on the Very Small Aperture Terminal (VSAT) technology, consisting of a 2.4 meter parabolic antenna. Other required hardware at receiving sites includes the radio receiver, indoor controller, x.25 packet assembler / disassembler interface, and a user workstation to receive and process the satellite broadcast. A workstation known as the Satellite Telecommunications and Analysis For Region IV system (STAR4), equipped with appropriate hardware and software, is available. Global Science & Technology, INC., (GST), provides installation and maintenance support for NWS supported STAR4 sites. Click here for more information about ISCS system components.

The output at the user site is the same X.25 protocol provided at the NWSTG. Since the protocols are proprietary, the receiving equipment (2.4 meter parabolic antenna) must be purchased from MCI, and access to the satellite broadcast is controlled by the meteorological authority of each contracting state. Workstations may be purchased from any suitable vendor.